

MEXICAN SNAKE-FLIES
(NEUROPTERA: RAPHIDIODEA)¹

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The geographical distribution of the genera of snake-flies has been discussed in two previous papers (Carpenter, 1936, 1956). Up to the present time, only two (*Agulla*, *Inocellia*) of the four genera in the order have been found in the New World, although the other two (*Raphidia*, *Fibla*) are represented in Miocene deposits of Colorado.

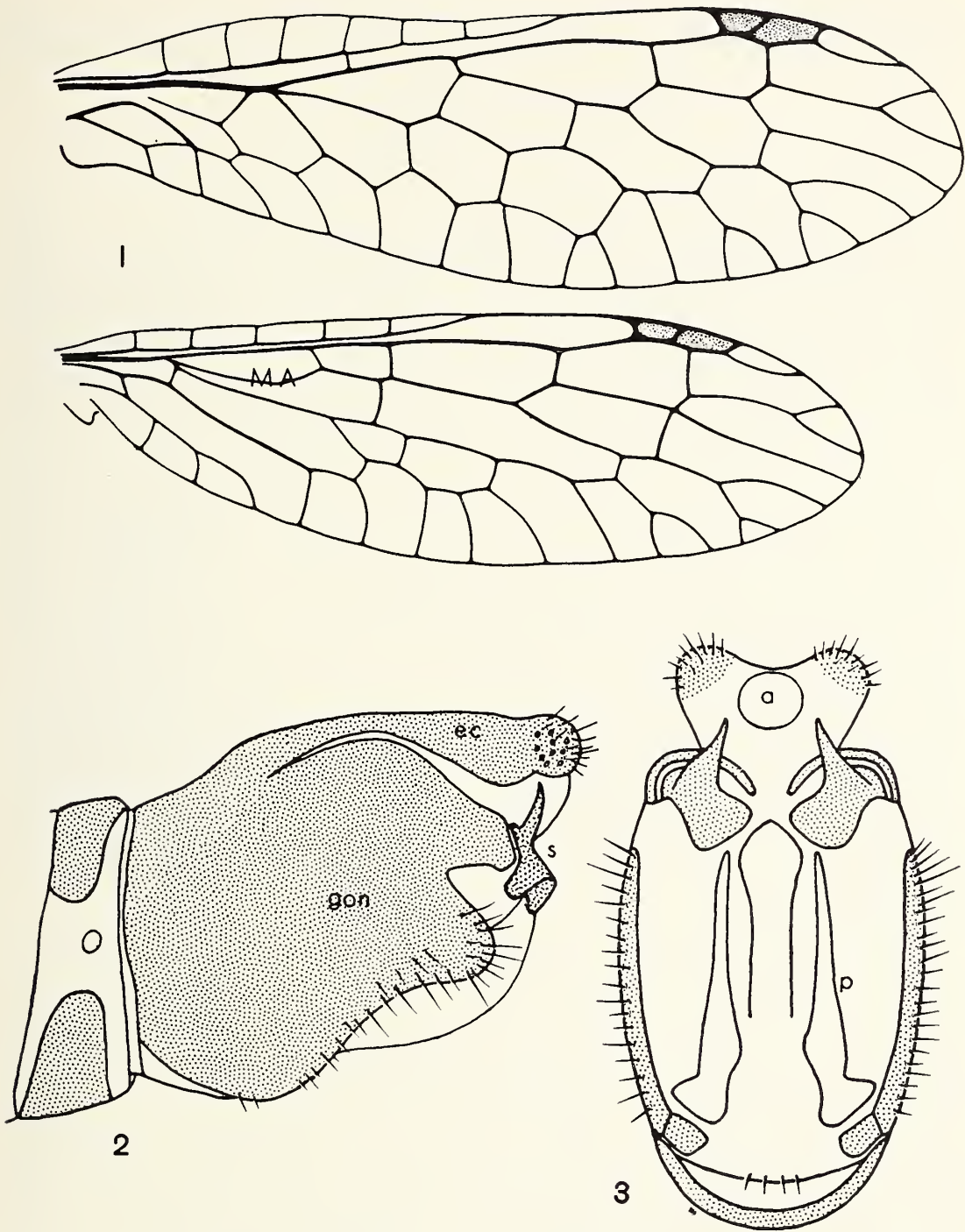
The present paper is concerned with several specimens of snake-flies obtained from Dr. William W. Gibson of the Rockefeller Foundation, Jean Mathieu of the Instituto Tecnológico y de Estudios Superiores de Monterrey, Mexico, and Dr. Henry E. Howden of the Canada Department of Agriculture, Science Service. The two species represented are of unusual interest: one belongs to *Raphidia* and is, therefore, the first living species of this genus to be found in the New World; the other is an *Inocellia* possessing strongly pilose antennae — a feature not otherwise known in the suborder Raphidiodea.

Family Raphidiidae

This family has previously been represented in the New World only by the genus *Agulla*. In addition to sixteen species occurring in parts of western United States and Canada, one species (*herbsti* Esben-Petersen) has been described from central Chile and two species have been described from Mexico. One of the latter (*australis* Banks) is known from San Lazaro in Baja California;² the other in southern Mexico. Specimens of the new species of (*caudata* Navas) was collected in the state of Guerrero

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² The locality given in the published account (Banks, 1895) is "San Lazaro, Baja California," but the labels on the two cotypes (M.C.Z.) of *australis* read "San Lorenzo, Baja California."



Raphidia americana n. sp. All drawings based on holotype. Fig. 1. Fore and hind wings. Fig. 2 Terminal abdominal segments, lateral view. Fig. 3. Same, posterior view. Lettering: MA, stem of anterior media; gon, gonocoxite; s, stylus; ec, ectoproct; a, anus; p, paramere.

Raphidia were collected in southern Mexico, a little north-east of the *caudata* locality.

***Raphidia americana*, n. sp.**

Plate 6, figures 1-3

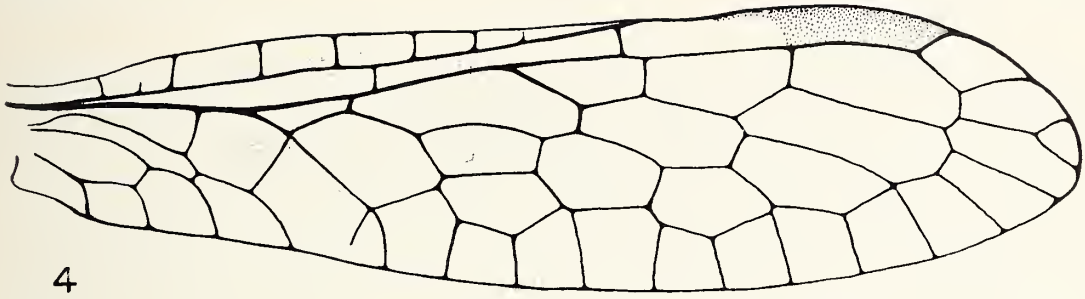
Male (holotype): length of fore wing, 6.4 mm.; width 2 mm.; length of hind wing, 6 mm.; width, 1.7 mm. Pterostigma about two and one-half times as long as wide. The general coloration and markings are typical of those of the genus; antennae, including first segment, yellow; head and prothorax black and reddish brown; thoracic tergites black, membranous areas of pleuron white; legs very light brown; abdominal tergites black, each with a white spot on the posterior margin near the outer edge of the sclerite; pleural membrane white; abdominal sternites brown, with a white patch posteriorly; wing veins nearly black; pterostigma yellowish, the proximal part somewhat darker than the distal. The terminal abdominal segments are shown in figures 2 and 3. The gonocoxites are firmly fused to the ninth sternite, forming a single, long, lateral plate; the styli are of moderate size, smaller than those of *notata*; the ectoproct is elongate, extending somewhat beyond the styli; the parameres are slender, weakly sclerotized plates closely pressed to the sides of the hypovalva.

Female (paratype): length of fore wing, 7.5 mm.; width, 2 mm.; ovipositor, 4 mm. The coloration and markings are similar to those of the males except for the antennae, the distal parts of which are dark brown (Antennal coloration is probably variable within the species).

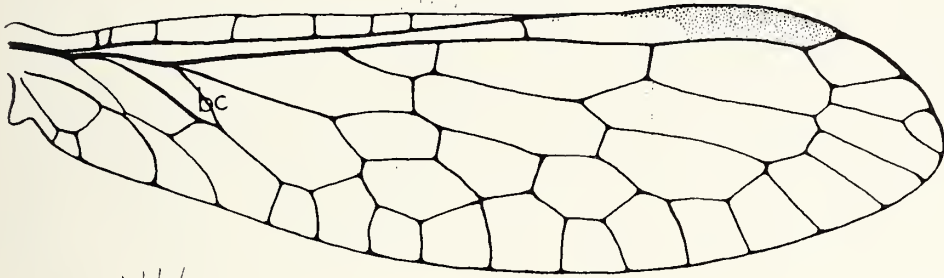
Holotype (♂): 5 miles north of Cuernavaco, Morelos, Mexico: 6000' elevation; beating pine; Aug. 28, 1958 (collected by H. E. Howden). In the Canadian National Collection Department of Agriculture, Ottawa, Canada.

EXPLANATION OF PLATE 7

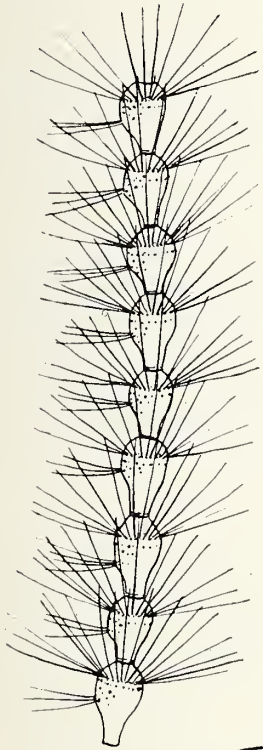
Inocellia pilicornis n. sp. All drawings based on holotype. Fig. 4. Fore and hind wings. Fig. 5. Part of an antenna. Fig. 6. A single antennal segment. Fig. 7. Terminal abdominal segments. Lettering: bc, basal crossvein.



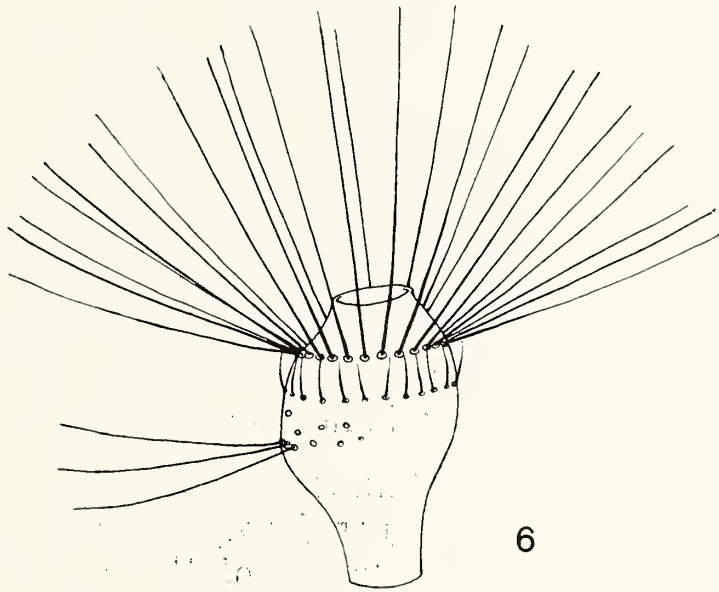
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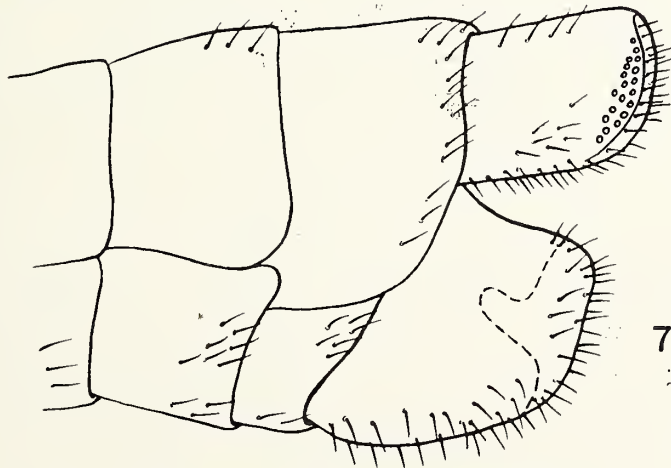
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Paratype (♀): Y.M.C.A. Camp, Tepaztlan, Morelos, Mexico; beating cypress; Aug. 21, 1958 (collected by H. E. Howden). In the Canadian Collection, Ottawa.

This insect clearly possesses the long piece of MA in the hind wing, characteristic of *Raphidia*, as opposed to its absence in *Agulla*. The species is readily identified by the fusion of the ninth sternite and its coxopodite into a single plate on each side. In *R. notata* of Europe the ninth sternite and coxopodite are partially fused, but in most species of the genus they are distinctly separated by a membranous suture. It is interesting to note that a similar complete fusion occurs in some species of *Agulla* (e.g. *xanthostigma*), representing an independent and parallel development of this condition.

In other respects, *americana* is not notably different from other species of *Raphidia*. It differs from *notata* in having smaller styli and the absence of hooks on the gonocoxites of the ninth sternite.

As noted above, *americana* is the first known living species of *Raphidia* to be found in the New World, as that genus is now conceived (cf. Carpenter, 1936). In all probability it is a derivative of the original population of the genus that existed in the New World (at least in Colorado) in the middle Tertiary.

Family Inocelliidae

This family has previously been represented in the New World by two species of the genus *Inocellia*: *inflata* Hagen and *longicornis* Albarda, both of which occur in California, Oregon, Nevada, Washington, and British Columbia. The occurrence of the following new species in eastern Mexico is, therefore, of unusual interest.

Inocellia pilicornis, n. sp.

Plate 7, figures 4-7

Male: length of fore wing 8.7 mm.; width 2.3 mm.; length of hind wing, 7.5 mm.; width 2.2 mm. Pterostigma four times as long as wide. The veins and the pterostigma are light brown in the holotype, but are very dark brown or even black in the paratypes. The markings on the dorsal surface of the head are typical of those of species in the

genus: the anterior half dark brown or black, the posterior half lighter brown with four streaks of dark brown extending towards the posterior border. The antennae are light brown in the holotype but, except for the first two segments, are dark brown or black in the paratypes; the prothorax is brown to dark brown or black except for the anterior border, which is very light; the dark portion has the irregular dark and light brown markings characteristic of the genus. Mesonotum dark brown or black (paratypes) with a median, very light brown spot; mesoscutellum light brown; metanotum marked like mesonotum except that the median light brown spot extends to the anterior margin of the segment and includes some white. Abdominal tergites dark brown or black laterally, with a median light stripe extending continuously along all tergites; the light stripe is mostly light brown but includes some white at the anterior and posterior edges of the genus *Inocellia*. The antennae are 7 mm. long and consist of 60 to 61 moniliform segments; the individual segments (see figure 6) are asymmetrical: on one side (the surface toward the other antenna) there is a cluster of three (rarely, four) long setae arising from nearly the same spot; this side of the antenna segment has a somewhat flattened appearance. Each antennal segment has a ring of 25 long setae, arising on the distal half of the segment; slightly proximally, near the middle of the segment, is a ring of 14 to 16 short setae which project distally. A few other setal sockets can be observed near the base of the cluster of three setae mentioned above. The terminal antennal segment is about twice as long as the others and lacks the peculiarities of the other segments; it bears about thirty setae. The prothorax is somewhat shorter than the head; the ectoproct has rounded posterior margins, somewhat as in *I. longicornis*; the gonocoxites of the ninth segment have the distal margin folded inward forming a curved tooth, which is similar to that in *longicornis*.

The female is unknown.

Holotype (♂): near Hidalgo, Tamaulipas, Mexico; March 27, 1938 (collected by C. C. Plummer). In the Museum of Comparative Zoology.

Paratype (♂): Monterrey, Nuevo Leon, Mexico; Feb. 26, 1956 (collected by Philip S. Barker); to be deposited in the collection of the Rockefeller Foundation Agricultural Program, Mexico, but temporarily placed in the Museum of Comparative Zoology.

Paratype (♂): 5 miles south of Monterrey, Nuevo Leon, Mexico; Sept. 3, 1958; night beating, Acacia-cypress area (collected by H. F. Howden). In the Canadian National Collection, Ottawa, Canada.

This species is at once distinguished from all other described species of the genus by the pilose, moniliform antennae. It is also noticeably smaller than the other species of *Inocellia* known from the New World, having a wing expanse of 17 mm. as compared with an expanse of 24 mm. for *inflata* and *longicornis*.

The inocelliid affinities of the new species are shown by the absence of ocelli, the absence of the basal pterostigmal veinlet, the presence of a forked posterior cubitus, and the oblique position of the vein *bc* (figure 4) in the hind wing. The species has the normal venational pattern of *Inocella* (not that of *Fibla*, see Carpenter, 1936): in addition, the structure of the head, prothorax, and abdomen, including terminal segments, is typical of that of *Inocellia*. Hence, although the antennae (of the male, at least) are different from those of all other Raphidiodea, consisting of moniliform, pilose segments, I am assigning the species to *Inocellia*. Should the female turn out to have other characteristics which are equally peculiar, a separate genus will probably be needed for the insect.

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